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LETTER

Value and price of ventilator-associated pneumonia surveillance as a quality indicator

Heleen Aardema, L Marjon Dijkema, Mark G Lazonder, Jack JM Ligtenberg, Jaap E Tulleken and Jan G Zijlstra*

Awareness of the importance of quality assurance in the ICU is growing but the methodology is still under development and subject to debate [1-3]. Ventilator-associated pneumonia (VAP) seemed to come close to being an important, valid, reliable, responsive, interpretable and feasible outcome parameter [3]. We therefore decided to measure VAP incidence on a regular basis. A prospective study was carried out with yearly assessment of the incidence of VAP during a 3-month period. Definition of VAP was based on the recommendations of the Centers for Disease Control and Prevention [4]. Overall, out of 550 patients ventilated for >48 hours, only two cases of definite VAP were observed [5]. Because no further improvement could be achieved in this field, we turned our attention to other outcome parameters. A perceived rise in incidence of VAP led us to repeat our evaluation, despite growing concern about the importance, validity and reliability of VAP as a quality indicator [2].

With the same methodology we measured the incidence of VAP again. Compared to our previous research, we observed a significant ($P < 0.001$, chi-square test) increase in VAP in accordance with our impressions (Table 1).

The incidence of VAP in our unit is still below that reported in the literature [2]. When used as a benchmark, we are performing well. However, when used as a quality indicator over time the results should lead to concern. Even if patients diagnosed with VAP do not have real VAP but colonization, atelectasis, or fluid overload, these conditions are also detrimental for the patient and should be avoided [2].

As a benchmark, VAP incidence might have limited value [1,2]. This is mainly due to inappropriate case mix correction and to diagnostic inaccuracy. Fear of being judged on disputable quality indicators such as inter-hospital benchmarks is a serious threat to the probably

Table 1. Patients characteristics and results

Patients ventilated >48 hours (n)	169
Male:female	110:59
Medical ICU (n)	49
Surgical ICU (n)	55
Neuro-surgical ICU (n)	29
Cardio-thoracic ICU (n)	36
Age, years, median (range)	60 (21-84)
APACHE II score, median (range)	19 (12-36)
Length of ICU stay, days, median (range)	12 (2-103)
Ventilator days, median (range)	7 (2-91)
VAP, definite (n)*	15
VAP, probable (n) [†]	12
Definite VAP per 1,000 ventilator days (n)	7.5
Percentage patients with definite VAP (%)	8.9%
ICU mortality, n (%)	34 (20%)
Mortality in patients with definite VAP, n (%)	2 (13%)

*Defined as based on Centers for Disease Control and Prevention criteria [4], with a new and persistent infiltrate on chest X-ray, a positive culture in trachea-aspirate or broncho-alveolar lavage, occurrence of purulent sputum, fever and/or leucocytosis or leucopenia as obligatory features. [†]Defined as based on Centers for Disease Control and Prevention criteria [4]; all the same circumstances as above except a positive culture as the required parameters. VAP, ventilator-associated pneumonia.

valuable use of intra-hospital trend analysis of quality indicators. Used as a longitudinal quality indicator in a single centre, VAP is less threatened by case-mix differences and the limited sensitivity and specificity of the VAP diagnostic criteria. The price of this quality assessment is considerable. The workload of this 14-week evaluation resulted in an estimated cost of 20,000 euros.

In our view, measurement of VAP incidence has its value as an intra-hospital quality indicator but not as a benchmark.

Abbreviations

VAP = ventilator-associated pneumonia.

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Competing interests

The authors declare that they have no competing interests.

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